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FEELINGS OF PAST LIVES AS EXPECTED PERTURBATIONS WITHIN THE NEUROCOGNITIVE PROCESSES THAT GENERATE THE SENSE OF SELF: CONTRIBUTIONS FROM LIMBIC LABILITY AND VECTORIAL HEMISPHERICITY[1]

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Summary.—Normal, young men and women who believed they may have lived a previous life ($n=21$) or who did not endorse ($n=52$) this belief of "reincarnation" were exposed to partial sensory deprivation and received transcerebral stimulation by burst-firing magnetic fields over either the left or right hemisphere. Individuals who reported belief in reincarnation could be discriminated from nonbelievers by their more frequent report of experiences of tingling sensations, spinning, detachment of consciousness from the body, and intrusions of thoughts that were not attributed to the sense of self. The results support the hypothesis that there may be neurocognitive processes which identify experiences as originating from the sense of self (episodic or autobiographical memory) or "not self." When anomalous experiences are beyond the boundary of the experiences contained with the generalization gradient of concurrent autobiographical memory, they are more likely to be attributed to culturally available default explanations such as living a previous life.

The human sense of self may be determined primarily by linguistic processes that facilitate the phenomenology of awareness and by the cumulative representations of experience or memory (Persinger, 1993). Declarative memory, which is often differentiated into semantic and episodic components, reflects the general reinforcement history of the individual and is associated with awareness (Tulving, 1983). Semantic memory is primarily unidimensional and refers to the experience of knowledge while episodic memory is multidimensional and refers to the self-awareness of when and where the knowledge was acquired.

If the physical bases for this type of memory are similar to operations found within other natural phenomena, then there would be a "critical mass" or cumulative number of memories required for the phenomenology of the sense of self to emerge. When linguistic images of autobiographical information are reconstructed by prefrontal processes and are attributed to memories, they are normally considered to have originated from within the self and to be compatible with its organization. Because the details which constitute the self are strongly affected by the person's reinforcement his-

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tory, this congruence between the experience of a self within time (the past) and the origins of memories from within that period, would be expected. The neurocognitive processes by which the origin of memories are experienced as emerging from the self should exhibit boundary properties which reflect a normal or Gaussian distribution.

Although most reconstructions of the past should be experienced as "self-memories" that are both compatible with and extrapolative from the person's autobiography, a very small proportion of these reconstructions should exceed the limits of this process and be experienced as "nonself" memories. Their occurrence would be potentially anxiogenic and would be expected to encourage explanations and the creation of narrative truths that would functionally reduce both the incongruity and the anxiety evoked by these anomalous "memories." Creation of "nonself memories" should occur more frequently in populations who are more imaginative or prone to dissociation (Barrett, 1996).

The occurrence of memories not attributed to the person's sense of self or personal autobiographical reconstruction has been recognized by philosophers and psychologists. Hypotheses such as repression and its intermittent fragmentation have been proposed to explain the intrusive, ego-alien, and apprehensive characteristics of these "memories." Other theorists have suggested nonself memories to be residuals of actual events that occurred during early ontogeny, before the development of linguistic capacities and the formation of the sense of self. An alternative hypothesis is that these phenomena are variants of the feeling of reminiscence. It is defined as the feeling that the current experience is a repetition of something which already happened although the discrepancies between the past and the present would only be about 25 msec. to 50 msec. rather than days or years (Persinger, 1993). The occurrence of memories that appear as suddenly revealed, "unrepressed" or ego-alien would be due to interference of the normal process that compares current experience with and differentiates it from actual representations of past experiences.

The neurocognitive characteristics and beliefs of people who report nonself memories could also elucidate the origin of these experiences. Considering the propensity for the human brain to code and to reconstruct for both visuospatial proximity and temporal contiguity, there should be two classes of explanations for experiences or memories perceived as not originating from the self. The first class of experiences would involve origins from another self within a different space during the same time and would comprise the common variations of ego-alien thoughts and intrusive memories. Within normal individuals these experiences might be attributed to culturally available explanations for apparent anomalies within space-time, such as telepathy. The second class of explanations would attribute the experi-

ences to different temporal frames originating within the same self. A likely implicit verbal chain would be: "I have a memory, it is not congruent with experiences that I have had within my lifetime, therefore I experienced it in another lifetime." One common but not necessarily accurate inference would be the belief that the person has lived several (past) lives.

During the last 15 years, questionnaire data from approximately 1,500 university students have indicated that about 25% of the population consistently report the possibility they may have lived previous existences. The purpose of the present study was to (1) characterize the subjective experiences and beliefs of normal people who report they may have lived a previous life, (2) discriminate the phenomenological profile of individuals who report this belief when they are exposed to experimental settings which encourage anomalous experiences, and (3) describe the potential neurocognitive processes and infer the cerebral locations from which these experiences might be produced.

The following hypotheses were considered. First, people who believe they may have lived a previous life will report a greater incidence of experiences similar to those of patients who exhibit complex partial epileptic seizures (Persinger & Makarec, 1993). The correlative increase in the synaptic efficiency between sensory and limbic regions within the cerebrum (Bear, 1979) would imbue odd or infrequent experiences with profound affect that would encourage the personal meaningfulness of a compatible belief or metaphorical generalization, e.g., the generalization from chirognomy that if the fingers are weak, the personality is weak. The prevalence of this process within the normal population is indicated by the neurocognitive characteristics of people who report "special meaning" for combinations of words or ideas that generate unusual or infrequent patterns of inference. Operationally, the evocation of a P300 (positive deflection, 300 msec. after stimulus presentation) voltage transient as inferred by topographical electroencephalographic measures within the mesiobasal structures (amygdala and hippocampus) during the presentation of an infrequent or odd stimulus (Halgren, Squires, Wilson, Rohbraugh, Babb, & Crandall, 1980) is very similar to the effect from novel combinations of propositions (semantics) that are generated by infrequent patterns of syntax. This class of combinations and patterns functionally define prose and poetry.

Semantic sequences containing words with disproportionately loaded connotative (affective) rather than denotative (categorical) content and whose combinations produce implications that are unexpectedly incongruent with acquired beliefs would also encourage the experience of "amygdaloid" meaningfulness. For example, the semantic sequence (although not necessarily logical) that (1) there are odd lights in the sky, (2) they are not explained by contemporary knowledge, (3) they are beyond the boundaries of causa-

tion by human intelligence, and (4) hence by categorical default the phenomena are due to nonhuman intelligence, e.g., extraterrestrials, gods, demons or some other functional substitution, would be expected to perfuse the conclusion with both meaningfulness and a sense of reality.

Skirda and Persinger (1993) found that high school and university students who more strongly endorsed exotic beliefs of alien intelligence and reincarnation also exhibited more dichotic word-listening errors. If the capacity to discriminate and to maintain the images of two simultaneously presented words is determined by processes that are vulnerable to signal/noise ratios and the source of the noise is increased input from mesiobasal structures of the deep temporal lobes, then the association between exotic beliefs and interference would be expected. Consistent with this hypothesis was the observation that this indicator of interference of enhanced input from mesiobasal limbic structures was also moderately (0.50) and positively correlated with the numbers of complex partial epileptic-like signs.

The belief that the self had lived previously requires a neurocognitive correlate that would encourage the conviction that the self is independent of the physical body. When normal sensory information is reduced and experimental conditions induce a greater than normal neurocognitive processing (imagery), these individuals should experience a feeling of "detachment" of the self from the body (Hypothesis 2) because of the transiently enhanced emphasis upon the sense of self and the experience of its independence.

The third hypothesis involved "intrusive" or ego-alien thoughts. Because beliefs are often strongly affected by experiences, people who experience phenomenology attributed to the nonself should be more likely to exhibit neurocognitive organizations that promote intercalation of left and right hemispheric processes. These individuals would be more likely to have histories of ego-alien intrusions such as the sense of a presence (Persinger, 1994a). These individuals should experience more intense images of detachment and the sense of presence when exogenous magnetic fields are induced over the right hemisphere relative to the left hemisphere.

Method

Subjects

A total of 36 men and 37 women, between the ages of 19 and 25 years served as subjects. They were enrolled in a first-year psychology course and obtained a 2% bonus for participation in a relaxation study. Each subject had been given the Personal Philosophy Inventory (Persinger & Makarec, 1993) during the class period a week to 3 months before the experiment ($Mdn = 50$ days). The subject's response to the item concerning belief in reincarnation was not known before the experiment.

Procedure

On the day of the experiment, each subject was asked to sit in a comfortable arm chair housed within an acoustic chamber. The subject was told that the experiment concerned relaxation. A modified goggle (two halves of a pingpong ball filled with cotton) was then placed over the eyes. A modified motorcycle helmet within which four solenoids were embedded along each temporal plane (4 pairs of solenoids) was then placed over the subject's head. After a dim red light for photographic development was activated, the experimenter closed the two chamber doors. The rationale for this reduction of normal visual and auditory input was to disengage suddenly the millions of neurons within the superior temporal and caudoventral temporal lobes from passive surveillance of background auditory and visual stimuli so that they could be recruited into other, transient neural networks which would amplify the effects of subtle (electromagnetic) induction to within the "critical magnitude" that would allow the correlative phenomenon to merge or protrude within the awareness of the subject. Support for the general validity of this interpretation is derived from the experiments of Babb, Wilson, and Isokawa-Akesson (1987) who showed that the intensity of the experience (from no effect to subtle changes in consciousness to overt, stereotyped displays) was a function of the proportion of neurons recruited into the field of paroxysmal discharges.

The subject was instructed to relax and that the experimenter was interested in any experiences that might occur. For the next 30 min. each subject was stimulated for every other 5-min. period with weak 1 to 5 microT complex magnetic fields which were generated by computer. The signals were designed to imitate the burst-firing of prototypical limbic (hippocampal and amygdaloid) neurons and were applied by the elliptical aggregate of solenoids along either the left or right temporal plane only. The details of the hardware and software as well as the specifications of the equipment have been reported elsewhere (Richards, Persinger, & Koren, 1993).

At the end of the 30-min. period, the experimenter entered the room and asked the subject to complete an exit questionnaire. The subjects were tested by one of two technicians who were not familiar with the hypotheses. Not more than three subjects were tested on any given day and the hemisphere of application was altered for each successive subject of the same sex during the approximately six months required to complete this study.

The questionnaire contained 18 items about the most common experiences and sensations that have been reported in this setting. The sensations included odd tastes, smells, vestibular effects, and visual alterations. Experiences included feeling a sensed presence, intrusions of thoughts that did not belong to the subject, and detachment of self from the body. The specific

list of these items has been published (Ruttan, Persinger, & Koren, 1990). The score for each item ranged from 0 (no occurrence), 1 (at least once), and 2 (multiple experiences).

After the session was completed, the subject's response to the item concerning belief in reincarnation was extracted as well as the following scores for clusters of items from the Personal Philosophy Inventory, namely, control, complex partial epileptic-like signs, sense of a presence (visitation by Cosmic Consciousness or Being), widened affect, and verbal meaningfulness. The items that composed these clusters have been described previously (Persinger & Makarec, 1993). In addition, the scores for traditional religious beliefs and a composite of items which have loaded on a factor named "exotic beliefs," i.e., aliens are responsible for UFOs (but without the reincarnation question), were extracted. These scores were included for analysis with the results of the 18 items from the exit questionnaire. One-way analyses of variance were completed between each of the 18 items and the no or yes response regarding belief of living a previous life (reincarnation). Because the rating of one individual may not reflect the same magnitude as another, relative ratings were computed by dividing the score of each item by the mean of all 18 items. The high probability that the individual items of the exit questionnaires shared less numerous sources of variance was discerned by factor analyses.

Results

When the information from the pretest questionnaire was obtained, a total of 21 subjects (28%) had indicated they believed they might have lived a previous life. They were designated as believers. Chi-squared analyses ($\chi_1^2 = 5.08$) indicated that significantly more of the subjects who believed they might have lived a previous life were women [(71%) compared to 42% ($n = 22$) who were nonbelievers (odds ratio of women to men = 2.01)]. The 12 subjects who preferred the left hand for writing (16% of the sample) did not exhibit disconcordant distributions for either belief or gender.

Two-way analyses of variance as a function of belief (no, yes) in reincarnation and sex (men, women) indicated that the believers exhibited ($F_{1,69} = 4.60$, $p < .05$; $eta = 0.26$) more frequent symptoms of complex partial epileptic-like signs ($M = 35\%$, $SD = 15\%$) than those who denied this belief ($M = 25\%$, $SD = 14\%$). The two groups did not differ significantly ($F_{1,69} < 1.00$; $p > .05$) with respect to the proportion of items endorsed for the clusters named Control, Traditional Religious Beliefs ($M = 41\%$, $SD = 25\%$) or Exotic Beliefs, which did not include the item concerning past lives ($M = 65\%$, $SD = 29\%$). Although there were also no group differences with respect to a history of experiencing meaningfulness during reading prose or poetry or a general widening of affect, the group who endorsed the possibility of a previous

life reported a marginally increased ($F_{1,69}=3.36$, $p<.10$; $eta=0.22$) history of a sense of a presence of cosmic consciousness during twilight states ($M=27\%$, $SD=25\%$) relative to those who did not endorse reincarnation ($M=16\%$, $SD=20\%$). There were neither sex differences nor interactions between sex and belief in reincarnation (all $Fs<1.00$).

The means and standard deviations for the absolute estimates of the incidence of specific experiences within the chamber for those who did not believe or did believe they may have lived a previous life as well as the relative scores (each item divided by the mean of all 18 items) are shown in Table 1. Three-way analyses of variance as a function of belief, hemisphere of field application (left vs right) and sex indicated that the subjects who believed in previous lives reported significantly ($p<.01$) more (all $dfs=1,65$) frequent experiences of tingling sensations ($F=9.68$, $eta=0.42$), the sense of self detached from the body ($F=5.13$, $eta=0.26$), vibrations within the body ($F=4.81$, $eta=0.33$), being somewhere else ($F=7.06$, $eta=0.36$), and spinning ($F=13.57$, $eta=0.48$) during the experimental treatment in the chamber as measured by the responses to the exit questionnaire. The subjects who reported the possibility of a previous life also reported more relatively intense

TABLE 1

MEANS AND STANDARD DEVIATIONS FOR ABSOLUTE SCORES AND RELATIVE (EACH SCORE DIVIDED BY THE MEAN OF ALL SCORES) SCORES FOR INCIDENCE OF DIFFERENT EXPERIENCES WITHIN THE CHAMBER FOR MEN AND WOMEN WHO BELIEVE ($n=21$) AND WHO DO NOT BELIEVE ($n=52$) THEY LIVED PREVIOUS LIVES

Variable	Absolute Score				Relative Score			
	No Belief		Belief		No Belief		Belief	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Dizzy	0.7	0.6	1.0	0.8	1.7	1.5	1.6	1.2
Presence	0.2	0.5	0.2	0.5	0.4	0.8	0.4	0.7
Tingling	0.8	0.8	1.4	0.7*	2.1	2.4	3.1	2.5
Images	0.4	0.7	0.5	0.7	1.0	1.8	0.9	1.2
Body Vibration	0.5	0.7	1.0	0.6*	1.3	1.7	1.4	1.4
OOBE	0.2	0.5	0.5	0.7*	0.3	0.7	0.8	1.4*
Anger	0.1	0.4	0.1	0.2	0.3	0.7	0.1	0.5
Sadness	0.3	0.6	0.1	0.2	0.7	1.3	0.1	0.2*
Ego-alien	0.1	0.2	0.2	0.5	0.1	0.4	0.4	1.0
Odd Smells	0.1	0.3	0.1	0.3	0.1	0.6	0.1	0.4
Fear	0.3	0.5	0.4	0.7	0.7	1.2	0.5	1.0
Odd Tastes	0.1	0.4	0.5	0.7*	0.2	0.8	0.7	1.0
Other Place	0.4	0.6	1.1	0.9*	0.7	1.1	1.5	1.2*
Childhood	0.4	0.7	0.4	0.7	0.8	1.4	0.5	1.0
Same Idea	1.0	0.8	1.1	0.8	2.4	2.6	2.2	1.9
Spinning	0.1	0.4	0.8	0.8*	0.3	1.0	1.0	1.2*
Dream images	0.3	0.6	0.4	0.7	0.5	1.1	0.7	1.1
Red Light	0.3	0.7	0.2	0.5	0.9	1.6	0.3	0.8

*$p<.05$.

experiences of detachment from the body ($F = 6.73$, $eta = 0.33$) and spinning ($F = 6.38$, $eta = 0.30$) when compared to the mean rating of all of the experiences within the chamber. Neither the statistical significance nor the size of the effects were affected when the person's general score for all other exotic beliefs (except reincarnation) or score for complex partial epileptic-like symptoms or score for religious beliefs was first covaried before the three-way analyses of variance were completed.

There was only one main effect for sex. The women reported more frequent experiences ($M = 0.4$, $SD = 0.7$) of a presence ($F = 6.53$, $eta = 0.31$) than did the men ($M = 0.1$, $SD = 0.3$). The relative incidence was also statistically significant ($F = 6.11$) and indicated that women (even when the general magnitude of endorsement of all items was controlled) experienced a sense of presence that was about 2.5 times more frequent than for men. There were two marginally significant main effects for the hemisphere (left vs right) over which the fields had been applied. Subjects who had received the magnetic field stimulation over the right hemisphere attributed greater proportions of their experiences to dreams ($F = 4.05$, $eta = 0.29$) relative to those who received stimulation over the left hemisphere. The trend ($F = 3.01$, $p < .10$; $eta = 0.24$) for those who received stimulation over the latter to report more frequent absolute episodes of detachment from the body is mentioned because of its prediction from previous hypotheses (Persinger, 1993).

The only variable which statistically significantly interacted with sex and hemisphere was the reported experience of fear. For both absolute and relative scores the significant interaction was due primarily to the report of more fear by the women ($M = 0.5$, $SD = 0.7$ and $M = 1.1$, $SD = 1.5$, respectively) who received the stimulation over the right hemisphere compared to the men who received this form of stimulation ($M = 0.1$, $SD = 0.2$ and $M = 0.3$, $SD = 0.8$) in context of comparable scores for both genders who received left-hemispheric stimulation (combined means and SDs for sexes = 0.2, 0.4, respectively, for the absolute score and 0.3, 0.6, respectively, for the relative score).

There were several interactions between the *a priori* belief in possible past lives and the hemisphere of stimulation by the magnetic fields. Subjects who believed they have had a previous life and received stimulation over the left hemisphere reported more frequent ($F_{1,69} = 5.04$, $p < .05$) over-all experiences in the chamber (M scores = 0.4 and 0.2) than those who received the same stimulation but did not have these beliefs. This former group did not differ from the two groups who received right-hemispheric stimulation (Ms = 0.3 and 0.1). Both the absolute and the relative magnitudes of the experiences attributed to memories from childhood were more frequent only for those people who believed in reincarnation and received stimulation over the right hemisphere. The major source of the interaction for experiences of de-

tachment from the body was associated with the greater perceived intensity of these experiences for believers who received stimulation over the right hemisphere than for nonbelievers who received the same stimulation.

To discern the shared sources of variance for the relative incidence of these experiences factor analyses by the principal component method were completed for the 18 measures from the Exit Questionnaire for men and women separately. After varimax rotation, two-way analyses of variance as a function of belief in previous lives and hemisphere of application were then completed. The rationale for this gender distinction at this level of analysis is the frequent report that men and women do not differ appreciably in means for multiple test applications yet display marked differences in the intercorrelations between variables which involve suggestibility and imagery (Bowers & Bowers, 1972; Persinger, 1996).

The construction of the two factors which contained the critical experiences of a sense of presence, detachment from the body, and ego-alien intrusions for men and women separately are shown in Table 2. Two-way analysis of variance of the standardized factor scores for the men as a function of hemisphere of application (left, right) and belief in living a previous life (no, yes) indicated that those men who received stimulation over the right hemisphere reported more frequent experiences ($F_{1,34} = 3.78$, $p < .05$; *eta* $= 0.33$) which were associated with the ego-alien intrusion factor ($M = 0.31$, $SD = 1.23$) than those who received stimulation over the left hemisphere ($M = -0.32$, $SD = 0.31$).

TABLE 2

FACTOR LOADINGS (IN PARENTHESES) FOR KEY VARIABLES AFTER VARIMAX ROTATION FOR FACTORS (EIGENVALUES AND PERCENTAGE OF VARIANCE EXPLAINED IN PARENTHESES) FOR MEN, WOMEN, AND BOTH GENDERS COMBINED

Men	
Factor 1 (2.75; 15%)	Factor 7 (1.32; 7%)
Presence (0.88)	Out-of-body Experiences (0.66)
Ego-alien (0.87)	Odd Smells (0.77)
Childhood (0.44)	Visual (–0.35)
Dream (0.35)	
Women	
Factor 1 (2.48; 13%)	Factor 2 (2.21; 12%)
Presence (0.70)	Ego-alien (0.87)
Visual Images (0.75)	Anger (0.83)
Out-of-body Experiences (0.74)	Dream (0.50)
Combined Group	
Factor 1 (2.42; 13%)	Factor 2 (1.96; 10%)
Presence (0.45)	Presence (0.68)
Out-of-body Experiences (0.60)	Ego-alien (0.62)
Smells (0.45)	Odd Tastes (0.79)
Other Place (0.40)	Dream Images (0.76)

For the women, the group who received the stimulation over the right hemisphere ($n=18$) exhibited significantly ($F_{1,32}=6.51$, $p<.01$; $eta=0.41$) more frequent experiences ($M=0.41$, $SD=0.33$) for items which loaded upon the ego-alien intrusion/dream factor than those ($n=19$) who received the same pattern over the left hemisphere ($M=-0.39$, $SD=0.20$). Of potential interest was a significant ($F_{1,32}=11.50$, $p<.001$) interaction between belief and hemispheric application for a weak factor (eigenvalue = 1.10) loaded only by thoughts from childhood. The women who believed they had lived previous lives and received stimulation over the right hemisphere reported enhanced incidence of experiences attributed to "childhood memories" (not shown in Table 2). The standardized scores indicated these experiences were 1.32 *SD*s more frequent than the scores for the women who believed in reincarnation and who received left-hemispheric stimulation. The women who were nonbelievers and who received stimulation over the left or right hemisphere differed by less than 0.5 *SD* for the incidence of these experiences.

Because one-way analyses of variance for the 18 variables do not identify the cumulative or optimal combinations of variables that would discriminate those who endorsed or did not endorse a previous life, discriminant analysis was completed on the absolute scores for the variables. The maximum numbers of variables to enter the function was set at 5. The discriminant function correctly classified 80% of the cases and was associated with a canonical correlation of .59 ($p<.001$). The function (standardized coefficients in parenthesis) showed that those who believed in previous lives experienced an additive complex of more tingling sensations (.55), experiences not coming from their own minds (.33), spinning (.55), and the experience of leaving or being detached from the body (.32) in the context of less sadness (−.48). The use of the relative scores, which was the score for each item divided by the mean for all of the 18 items, generated a function of comparable strength with the same variables except that sadness was replaced by dizziness.

Discussion

The purpose of the present study was not to compare the experiences of people who were exposed or not exposed to transcranial, complex magnetic fields. The purpose was to discern whether individuals who believe they have lived previous lives report different experiences than those who do not share this belief when both groups are exposed to transcranial magnetic fields. Intrinsic comparisons were completed by evaluating the reports of both sets of believers as a function of stimulation primarily over the left or right temporoparietal regions.

Compared with individuals who did not report a belief in reincarnation, individuals who endorsed an item indicating they believed they may have

lived previous lives reported significantly more specific experiences while they were exposed to an experimental condition that has been hypothesized to affect directly the neuronal networks at the magnitudes with which consciousness and the sense of self are associated. These experiences included the feeling of the self detached from the body, displacement of consciousness to a different place, tingling, spinning, low frequency vibrations within the body and odd tastes. Discriminative analyses indicated a combination of experiences that discriminated nonbelievers and believers. These reports included experiences of tingling sensations, the feeling that the experiences did not originate from their own minds, spinning, detachment from the body, and (less intensely) sadness.

From a strictly behavioral perspective, the capacity for the quantitative estimate of the frequency of four or five specific experiences to differentiate partially two groups of normal people on the basis of their no-yes response to a single item (reincarnation) several weeks before the experiment confirms the potential potency of using self-report questionnaires in predicting future phenomenology. The results also emphasize the importance of the influence of beliefs which can be defined as the person's self-organization of the myriad of unrelated and often anxiogenic experiences upon specific types of experiences within unusual settings. As this experiment involved a double-blind procedure (neither the subjects nor the technicians knew the key hypotheses), the probability of contamination from cues was minimal. Because the differences between the groups who believed or did not believe that they may have had past lives was not affected after first covarying for a general belief in other exotic themes (UFOs, time-travel, life on other planets), the likelihood that the differences in reported experiences between the nonbelievers and believers were due to some nonspecific endorsement of strange beliefs in addition to previous lives is minimal.

The principles of modern neuroscience predict that the experiential correlates of those portions of the brain most active metabolically at any given time will dominate experience. Although the items from the exit questionnaire did not sample all possible classes of subjective experiences, the fact that the sense of a presence, intrusive thoughts from "ego-alien" sources, odd tastes, strong smells, dream-like images, and displacement of consciousness from the body to other places loaded on two distinct factors suggests at least two sources of shared variance. The significance of the clustering of these items is amplified when one considers the cumulative literature regarding the consequences of direct electrical stimulation of the hippocampal-amyloid complex of temporal lobe epileptic patients.

About a century has elapsed since J. H. Jackson articulated a possible neuroanatomical substrate for the feeling of reminiscence (that current experience is a repetition of something already lived) within the temporal lobe of

the epileptic brain. The experience was associated with a doubling of consciousness (mental diplopia or out-of-body experience). During the peri-ictal process, according to Jackson, there appeared to be the simultaneous existence of a depressed normal consciousness plus a second, parasitic consciousness whose content appeared to be real. Recent, more direct evidence from stereotaxic electroencephalography (Bancaud, Brunet-Bourgin, Chauvel, & Halgren, 1994) indicated that these dreamy states can be evoked in partial complex epileptic patients if electrical stimulation elicits paroxysmal activity within the hippocampal-amygdaloid formation and the superior temporal gyrus. Because paroxysmal electrical discharges that spread (but are contained) within the left hemisphere almost invariably result in suspension of consciousness, right-hemispheric stimulation would be expected to enhance the likelihood that these feelings of "another consciousness" or "another self" would be both experienced and remembered.

We (Persinger & Makarec, 1993) have shown psychometrically that a significant portion of the variance for suggestibility and complex epileptic-like experiences emerges from the same "third factor" (Persinger, 1994b, 1996). In the present study the subjects who believed they may have lived previous lives reported experiences very similar to the cognitive correlates of suggestibility. Tingling sensations, body vibrations, feeling of detachment, and the sense of a hidden observer or "presence" are frequent symptoms that emerge persistently within most procedures by which hypnotizability or suggestibility are assessed (Spiegel & Spiegel, 1978). If there is a causal relationship between this cluster of experiences and belief in previous lives, then the increased vulnerability to this belief for highly suggestible patients should be seriously considered by clinicians who routinely employ regression ("past life") hypnosis.

Populations of people who exhibit intrinsically elevated complex partial epileptic-like signs such as actors, actresses, musicians, writers, and artists would be most vulnerable. Many depressed patients exhibit a marked increase in metabolic activity within the limbic system but decreased activity within the prefrontal regions. Consequently, moderately psychologically depressed patients would also be vulnerable to subtle therapeutic instructions in light of the involvement of the orbitofrontal lobes with the hypnotic process (Crawford, 1996).

Beliefs are highly simplified, linguistic taxonomies of experiences whose primary function is to reduce the apprehension or the ambiguity of phenomena for which there are insufficient data. From a neuropsychological perspective, the normal operations of prefrontal functions allow the individual to self-organize and to structure the myriad and often anxiogenic experiences of life into functional explanations that minimize the apprehension of self-dissolution, i.e., death. The fundamental semantic operation (most likely me-

diated by implicit verbal chains), that is associated with the concept of reincarnation is negation of self-dissolution, i.e., no personal death. Consequently the correlative decrease in existential anxiety associated with labelling an experience as originating from a previous life (and hence by inference the possibility of another life subsequent to the present) would both reinforce and maintain the belief system such that other unusual or infrequent experiences would henceforth be integrated into the explanation.

Experiences of "memories" that do not appear to originate from the self or that are not compatible with the person's reconstruction of the past (autobiographical memory) may be more common and more stable within the population than suspected. During the last 15 years there has been no statistically significant change in the proportion of first-year arts students who have endorsed the prospect of having lived a previous life. The mean percentage has been 25%.

Individuals who (1) are prone to sensory-limbic hyperconnectionism (Bear, Schenk, & Benson, 1981) would imbue infrequent, odd, or amygdaloid-enhancing experiences with enhanced meaning (inferred by complex partial epileptic-like signs in this study) and (2) exhibit a predilection for intrusive processes that are typically involved with right-hemispheric function (induced by the asymmetric application of burst-firing magnetic fields over the hemispheres), could acquire information without the concomitant activation of the neurocognitive processes that accompany the sense of self.

The reconstruction of an experience that is familiar but yet is discriminably different from the cluster of experiences labelled as one's unique memory could involve a process similar to *déjà vu* as normally applied to percepts. This experimenter has suggested (Persinger, 1993) that the latter occurs in situations where there is a mismatch between the arrival times of bilateral information within the two hemispheres. Consequently, people who are prone to frequent but intermittent delays in bilateral processing such as patients with complex partial epilepsy and a focus within the limbic system or highly creative individuals who display frequent complex partial epileptic-like signs and symptoms should and do have quantitatively more of these experiences than does the average person.

Average people, particularly if they displayed elevated limbic lability as inferred by elevated scores for complex partial epileptic-like symptoms, could experience brief but less intense equivalences of these paraepileptic states during periods that promote the interhemispheric discrepancy. Within natural settings, these periods would include the mingling of dream states with normal waking states during the occasional continuation of the latter, e.g., during studying or writing within a quiet environment beyond the normal period of cessation of consciousness (such as between 0200 and 0400

hr.) or episodes of fatigue which would be the equivalent of a reduced proficiency in left-hemispheric, linguistic processing.

Given the strong role of right-hemispheric activation to this process (Gordon, Frooman, & Lavie, 1982), lucid dreamers should be significantly prone to experiences of events that would be experienced as memories in an anomalous comparison of stored memory with the contemporary experience, an idea proposed by Penfield (1958). Within our experimental settings, we hypothesized that these experiences would be encouraged by the asymmetric application of burst-firing magnetic fields to the cerebral hemispheres. Consistent with this prediction was the finding that women who received stimulation over the right hemisphere reported more frequent sensations they attributed to intrusive thoughts and to dreams.

The attribution of the occasional "intrusive memory" to self-memories from another body and another time would be potent anxiolytic attributions because they would not be easily refutable and would imply immortality. Once sequestered within the memory process they could become the context by which the person defines the self and all subsequent experience. Because one's autobiographical past requires the temporal organization of memories and is primarily mediated by prefrontal functions, socially imposed organizational schemata for these experiences can influence their organization. If neurons within the dorsolateral frontal cortex encode contextual information, then psychosocial concerns such as the "end of the world" and cognitive expectancies would affect the interpretation and attribution of the experience.

The results of the present experiment also replicated the findings of other studies. The general enhancement of reports of fear by women who received stimulation over the right hemisphere compared to the left was reported by Richards, Koren, and Persinger (1992). Both this gender difference and the enhanced sense of a presence by normal women within the experimental setting compared to men is consistent with the concept that women exhibit more frequent interhemispheric coherence or intercalation (Persinger, 1993).

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